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CASE REPORT

Foreign Object Lodgment in the Root Canal and Its Management: A Case Report and an Overview

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ABSTRACT

Self-introduced foreign object by an adult into the root canal of a lower incisor is seldom reported in the endodontic literature. This case report describes a self-introduced unusual foreign body and its retrieval from the root canal of lower left lateral incisor. A persistent sinus tract resistant to calcium hydroxide intracanal medicament was then successfully treated with the use of triple antibiotic paste. Postendodontically, nonvital bleaching and composite resin restoration was used to restore the form, function and esthetics of the tooth in a conservative manner.

Keywords: Foreign object, File braiding technique, Stieglitz forceps, Triple antibiotic paste.

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INTRODUCTION

Foreign objects which have been implanted into the canal by the patients have varied from staple pins,[1-4] paper clip,[5] nail,[6] metal screw,[7] sewing needle[4,8] to minute hand of a watch,[9] beads,[10] plastic chopsticks,[11] incense sticks,[12] etc. (Table 1). These foreign objects are usually seen in wide open canals that have been exposed either due to caries or trauma or iatrogenically kept open for draining. This generally happens when the patient tries to remove the food debris plugged into the open pulp space.[3] These objects once lodged into the canal can act as focus of infection[13,14] and can also prevent the clinician from performing proper root canal therapy.[15]

Although no standard method has been recommended, the techniques employed to retrieve a separated endodontic instruments can be used for the removal of the foreign objects from the root canal.[16] These methods include the use of ultrasonic equipment, fine forceps, endodontic files, hollow tube-based extractor systems, etc.[17] In case a foreign body is extending beyond the apical foramen, then a surgical approach may be deemed necessary for retrieval.[3,18]

This case report illustrates a self-introduced foreign body by an adult patient into the root canal of a lower incisor and its retrieval by employing file braiding technique to facilitate nonsurgical endodontic therapy.

CASE REPORT

A 39-year-old female patient reported with a chief complaint of dark discoloration and occasional dull pain in lower left lateral incisor (32). Although patient gave a history of trauma and fracture of this tooth, she gave no history of undergoing any treatment for the same. Patient's medical history revealed that she was diabetic and taking oral medication. Intraoral examination revealed a discolored 32 with an oblique fracture of incisal third of the crown. The pulp chamber of the tooth was open to the oral cavity (Fig. 1). A sinus opening with associated pus discharge was found in relation to the labial mucosa of this tooth. Thermal and electric pulp testing failed to elicit any response in the tooth. Intraoral periapical radiograph revealed the presence of an unusual radiopaque linear foreign object in the cervical third of the root canal of 32. Large periapical radiolucency having an ill-defined border was noticed in relation to this tooth (Fig. 2A). On further history-taking, patient revealed the habit of using metallic objects to remove food debris stuck in the open pulp chamber. However, she could not recall any incidence of lodgment of a metallic object within the root canal. A diagnosis of nonvital 32 with associated chronic apical periodontitis and foreign body lodgment was made. Patient was then advised to undergo the retrieval of foreign object followed by endodontic therapy.

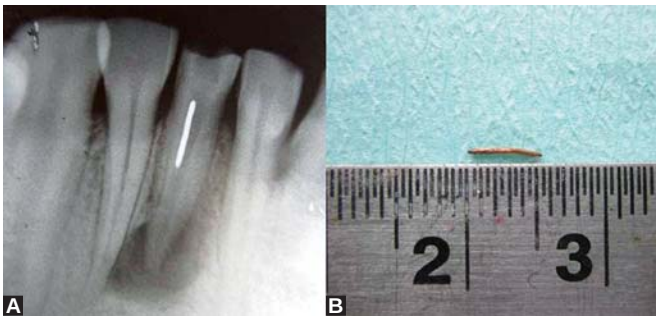
The food debris and the necrotic contents were removed from the pulp chamber of the tooth. Although the foreign body was visible to the naked eye, it was not accessible for grasping by a forceps. However, since it could be bypassed

Fig. 1: Preoperative picture showing discolored lower left central incisor (#32)

by the files, three no-15 H-files (Dentsply-Maillefer, Ballaigues, Switzerland) were inserted into the canal, twisted around the object to engage it and pulled coronally. This file braiding technique partially dislodged the foreign body into the pulp chamber. A Stieglitz forceps (Hu Friedy, Chicago, Illinois) was used to grip and retrieve the foreign body which was found to be a metal fragment (Fig. 2B). Working length was determined and root canal shaping and cleaning was carried out using step-back technique. Canal was irrigated using 2.5% NaOCl (Novo Dental Products Pvt. Ltd. Mumbai, India) and 17% EDTA (BN Laboratories, Mangalore, India). Calcium hydroxide (Calicur, Voco and Cuxhaven, Germany) was placed as an intracanal medicament. However, the sinus opening failed to heal, despite repeated change of calcium hydroxide dressing. The confirmation of this was done with gutta-percha tracing (Fig. 3). Therefore, it was decided to employ triple antibiotic paste which was prepared, as described by Takushige et al[19] using commercially available capsules of ciprofloxacin (Cifran 500 mg, Ranbaxy Laboratories Ltd, India), metronidazole (Metrogyl 400 mg, JB Chemicals and Pharmaceuticals Ltd, India) and minocycline (Minoz 50 mg, Ranbaxy Laboratories Ltd, India). Following the removal of the enteric coating of the capsules, the contents were pulverized using a mortar and pestle and mixed with propylene glycol to obtain paste form. The paste was packed into the canal using hand pluggers and the access was sealed with zinc-oxide eugenol cement (Kalzinol, De Trey, Dentsply and Konstanz, Germany).

Following 4 weeks recall visit, tooth 32 was found asymptomatic and sinus opening showed healing. Subsequently, the canal was obturated by lateral compaction using gutta-percha (Dentsply-Maillefer, Ballaigues, Switzerland) and AH plus sealer (Dentsply, De Trey, Konstanz, Germany) (Fig. 4). The tooth was then subjected to walking bleach using a mixture of sodium perborate (VK Enterprises, Mumbai, India) and superoxol (National Peroxide Limited, Mumbai, India) following the application of glass ionomer cement barrier (Fuji lining cement, GC, Tokyo, Japan). The labial surface of the tooth, except the cervical area, responded satisfactorily to bleaching (Figs 5A and B). One week postbleaching, the tooth was reinforced, access cavity was sealed and labial veneering was carried out using Filtek Z350 composite resin (3M ESPE, St Paul, Minnesota) to mask the discoloration (Fig. 6).

The patient was recalled at 1, 2, 6 and 18 months intervals for follow-up. Clinical examinations showed no sensitivity to percussion or palpation, and the soft tissues were healthy. Postoperative radiograph taken after 18 months showed an increase in periradicular bone density suggestive of progressive healing (Figs 7A and B).



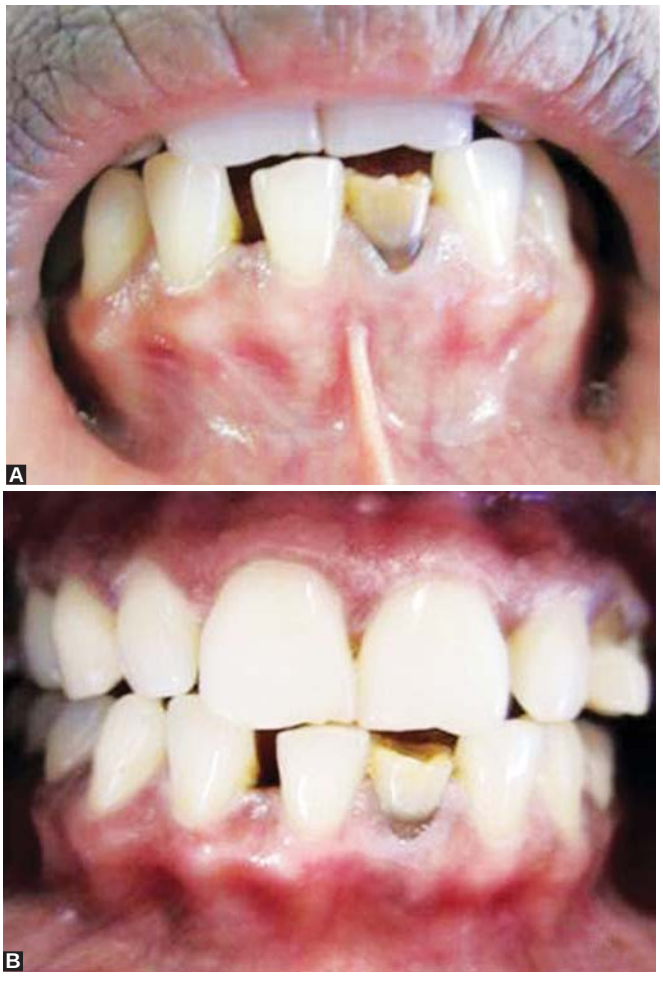
Figs 2A and B: Intraradicular foreign object: (A) preoperative radiograph showing an unusual radiopaque object in the root canal along with periapical radiolucency, (B) metallic foreign object that was removed from the root canal

DISCUSSION

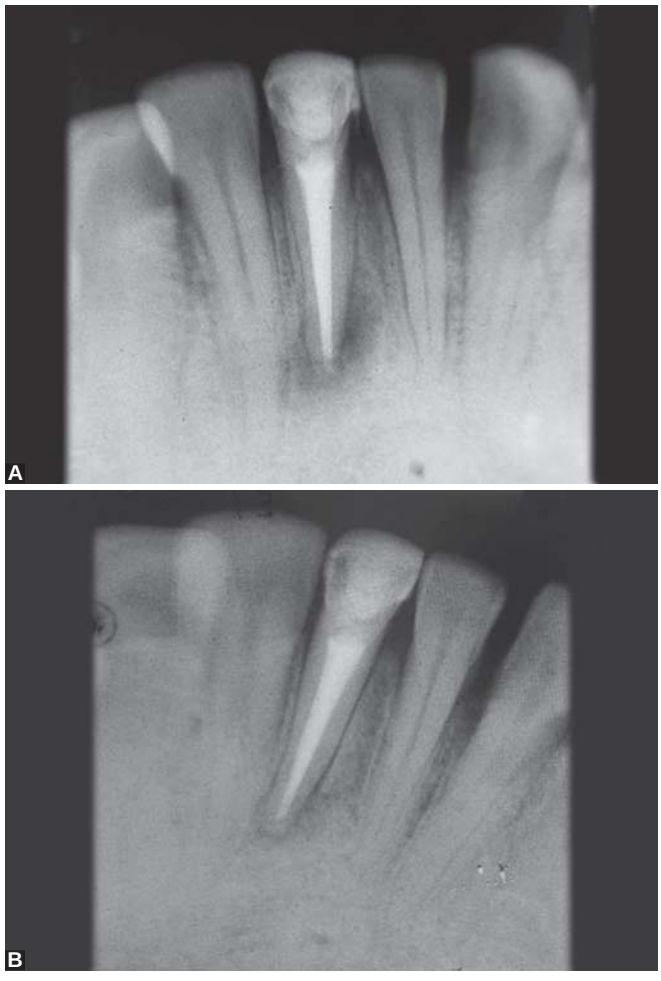
Patient introduced foreign objects in the root canal are an occurrence which has rarely been reported in adults

Fig. 3: Gutta-percha tracing of the nonhealed sinus tract after 2 months of calcium hydroxide intracanal medicament placement

Fig. 4: Immediate postobturation radiograph



Figs 5A and B: Results of walking bleach: (A) after 7 days, (B) after 14 days



Figs 7A and B: Follow-up radiographs showing evidence of progressive periradicular healing: (A) 6 months after treatment, (B) 18 months after treatment

Fig. 6: Composite resin restoration to seal the access cavity, reinforce the tooth and to mask the discoloration

(Table 1). As the patient, in this case report, gave no history of previous endodontic treatment, the probable reason for the lodgment might have been the open pulp chamber subsequent to the traumatic fracture in lower left lateral incisor (32) and patient's habit of using metallic objects to remove food debris from the pulp chamber. The exposed pulp chamber provided direct access for the lodgment of the metallic fragment, about which patient was not aware.

Various factors that can play important role in selecting a technique for the retrieval of foreign objects within the root canal is depicted in Figure 8.[9,20-24] In this case report, as the preservation of the remaining thin radicular dentin was deemed important and since the foreign object could easily be bypassed, file braiding or multiple file technique was employed to engage and dislodge it. This technique first described by Glick consists of inserting multiple H-files and twisting them around the foreign body. H-files are preferred in this technique as their flute design is suitable for engaging the body. The braided multiple H-files would exert a gripping force that aids in removal of the foreign body.[25] The use of this technique has been reported in the endodontic literature.[15,21] In this case, the use of hollow tube-based extractor systems, such as Masserann kit would have led to further weakening of the already thin radicular structure. Although it has been reported that the use of ultrasonics has the potential to push the foreign body beyond

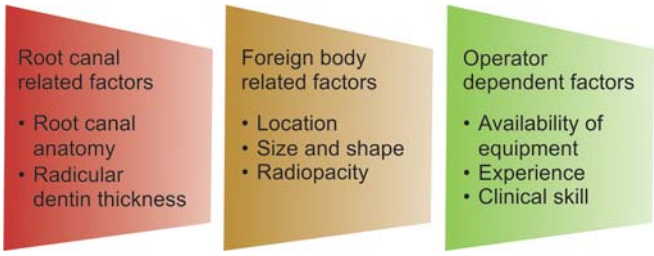


Fig. 8: Factors that can affect the retrieval of intraradicular foreign object

the apex and further complicating the situation, its use in this case was a suitable alternative as the foreign body was lodged in the cervical third of the root canal.[16]

Stieglitz forceps are used to grip and retrieve foreign objects which are clinically visible in the coronal access. It allows the clinician to achieve a firm hold of the object and extract it. It is available in different sizes and angles. Further, it can be modified to allow deeper penetration into the tooth.[17] In this case, the foreign body was not accessible for gripping by the beaks of Stieglitz forceps as it was not projecting into the pulp chamber. However, once the foreign body was dislodged into pulp chamber by file braiding technique, Stieglitz forceps was useful in gripping and pulling it out.

In this patient, despite multiple calcium hydroxide dressings, sinus opening failed to heal. It is said that the foci of infection, if not eliminated at the earliest can lead to complications like biofilm formation, which may be difficult to eliminate later. It is shown that biofilms are more likely to be present in association with longstanding pathological process, as in case of a large lesion.[26] In such situations, calcium hydroxide, a commonly used intracanal medicament, may not be able to successfully eliminate the microorganism due to their complexity in established endodontic infections.[27] In these circumstances, the topical use of triple antibiotic paste, a mixture of ciprofloxacin, metronidazole and minocycline, has been advocated and shown to be very effective in eliminating endodontic

Table 1: Various foreign objects implanted into the root canal by patients

Authors	*Foreign object*	*Age and sex*	*Tooth and location*	*Treatment*
Holla et al (2010)[4]	Staple pins and aluminum foil	10 years; female	#53	Extraction
	Sewing needle	5 years; male	#51	Extraction
Lehl (2010)[5]	Paper clip	6 years; male	#55, within the canal	Extraction
Kataoka et al (2010)[6]	Nail	12 years; male	#11, within the root canal	Three K-files interlaced for removal
Aduri et al (2009)[3]	Stapler	12 years; female	#26; palatal root	Ultrasonic scaler used to loosen and removed with explorer
	Stapler	10 years; male	#21, periapical region	Periradicular surgery
Gadgil et al (2009)[12]	Bunch of incense sticks	13 years; male	#21, apical extrusion	Extraction
Prabhakar et al (2008)[14]	Piece of ornament	12 years; male	#11, within the apical third of root canal	File and tweezer used for removal
Ozsezer et al (2006)[9]	Minute hand of a watch and pencil lead	14 years; female	#11, within apical third of the root canal	Removed using H-file
McAuliffe et al (2005)[2]	Staple pin	11 years; male	#21, within the root canal	Removed with barbed broach
Nadkarni et al (2002)[8]	Sewing needle	12 years; male	#16, palatal canal	File and tweezer used for removal
Balto (2002)[20]	Straight pin	12 years; female	#21, periapical area	Removed using braiding technique
Srivastava et al (2001)[18]	Straight pin	12 years, male	Maxillary central incisor periapical area	Periapical surgery
Rao et al (1999)[1]	Stapler pin	13 years; male	#21, apical extrusion	Extraction
Prabhakar et al (1998)[7]	Metal screw	13 years; male	#36, pulp chamber	Extraction
Walvekar et al (1995)[15]	Sewing needle	19 years; female	#22, within the root canal	Removed using H-files
		24 years; male	#11, cervical third of root canal	Removed using H-files
Toida et al (1992)[11]	Plastic chopstick	12 years; male	Unerupted supernumerary tooth	Extraction
Subbareddy et al (1990)[10]	Beads	12 years; female	#11 and #21, within the root canal	Removed using K-files

pathogens.[28-30] Although, antibiotics as intracanal medicament should not be used in routine endodontic cases to avoid the possible side effects like bacterial drug resistance and allergic reactions, the chances for systemic side effects are thought to be minimized as the dosage of antibiotic drug combination used for topical application is low.[19,28]

It is said that crowns do not significantly improve the success of endodontically treated anterior teeth, besides conservative modes employing bleaching and resin restorations may be adequate for esthetic and functional requirements.[31] In this patient, the discolored cervical defect failed to respond to bleaching. This could probably be due to the cervical location of the metal fragment and migration of its corrosion products into the dentin. It is said that tooth discoloration due to metallic corrosion products are difficult to bleach. Nevertheless, in this patient, nonvital bleaching followed by composite restoration helped in conservative and satisfactory postendodontic management.

CONCLUSION

Self-introduced foreign body by an adult due to open pulp chamber in the lower incisors is less often reported. File braiding technique and Stieglitz forceps can be useful for retrieving a foreign body from lower incisors, especially when minimal loss of dentin is desirable. Triple antibiotic paste might be effective in promoting endodontic healing, particularly in long-standing periapical infection which does not respond to calcium hydroxide intracanal medicament. The use of bleaching combined with composite restoration can be useful in satisfactory postendodontic management of a lower incisor and avoid a crown.

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